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PROGRESS  
of the  
Barberry Eradication  
Campaign  
in  
SOUTH DAKOTA in 1929

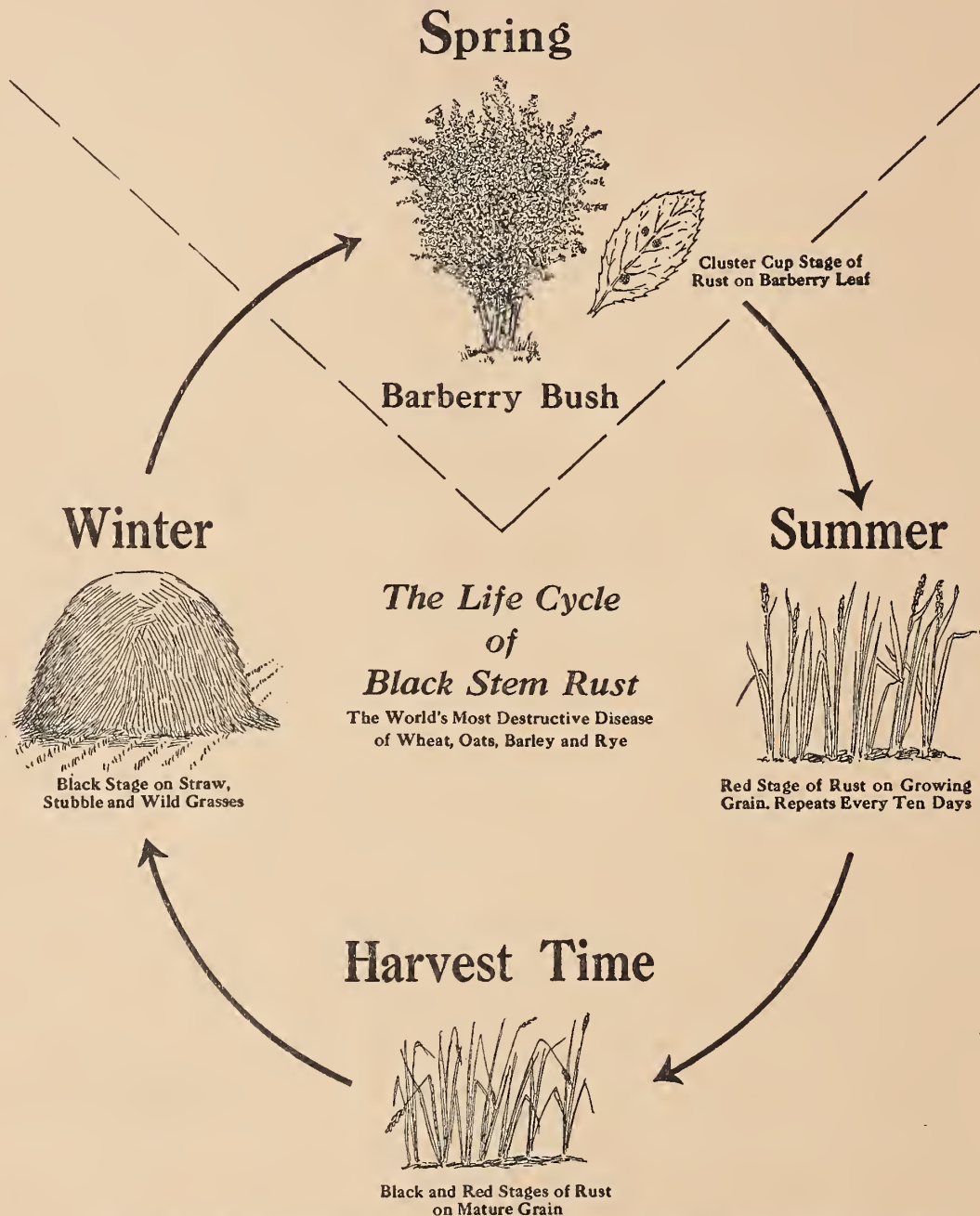
Jan 11



*Our Grain Crops Must Be Protected from Black Stem Rust*

*Barberry Eradication Pays*

# Remove the Barberry and Break the Rust Cycle



All Common Barberries act as starting points for Black Stem Rust early each spring. By destroying the barberry the early spring source of black stem rust is eliminated. The Common Barberry provides a means to bridge the gap between the black stage on grain in the fall and the red stage of the rust on grains and grasses the following spring.

**BOOST BARBERRY ERADICATION—A PRACTICAL RUST  
CONTROL MEASURE**



# PROGRESS OF THE BARBERRY-ERADICATION CAMPAIGN

IN SOUTH DAKOTA, 1929

By R. O. Bulger, Agent,<sup>1/</sup>

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United States Department of Agriculture

## Introduction

South Dakota produces annually about 150,000,000 bushels of wheat, oats, barley, and rye. These crops are subject to attacks of black stem rust. In certain past years the loss from this disease in South Dakota alone has amounted to nearly 75,000,000 bushels of grain, or about one-half of the crop. The average yearly loss from black stem rust in this State has exceeded 10,000,000 bushels. During the last few seasons these losses have not been so severe.

The above figures are more clearly remembered when one considers that a loss of 75,000,000 bushels in this State means approximately \$800 per farm, while a loss of 10,000,000 bushels means an average of \$125 per farm. These figures are based upon the average fall price of crops. Obviously any control measure which will reduce these enormous losses deserves the cooperation of every man, woman, and child in South Dakota and the entire grain-growing region of the United States.

## Control Measures for Stem Rust

Several control measures for black stem rust have proved effective. No single method of control will entirely eliminate the disease, but a combination of all of them will reduce the losses to a point where they will be of no serious consequence.

The eradication of every harmful barberry bush in the grain-growing areas of the United States is essential to the material reduction of damage from stem rust. The barberry is an ornamental shrub found growing all over South Dakota, having been planted by the early settlers. This rust-spreading bush is present not only in farmyards but grows wild in many unusual places, including the crevices of the precipitous cliffs of the Black Hills, in dense thickets of wild currants, gooseberries, plums, wild grapes, and poison ivy, and among the sumach bushes along the various river banks.

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<sup>1/</sup> State Leader of barberry eradication in South Dakota.

<sup>2/</sup> From the beginning of the campaign in 1918 until January 1, 1930, barberry eradication was a project of the Office of Cereal Crops and Diseases, of the Bureau of Plant Industry. The Office of Barberry Eradication was established as a separate unit of the Bureau January 1, 1930.

Black stem rust is a disease of small grain crops comparable to the diseases that affect humans and animals. It is caused by a tiny germ or spore. These spores must start their growth every spring in South Dakota upon the leaves of the common barberry. Consequently, every common barberry growing in this State is a starting place for an epidemic of stem rust and should be located and destroyed as soon as possible.

It also is definitely known that certain varieties of wheat, oats, and barley ordinarily do not rust so much as other varieties. These rust-resistant crops should be grown if they are desirable from the standpoint of yield, milling quality, resistance to other plant diseases, and if they are of good market value. Unfortunately no rust-proof grain has yet been found. Plant breeders have been working on this problem for years and have made excellent progress, considering the many difficulties encountered. The search for resistant grains should be encouraged along with barberry eradication.

The production of rust-resistant varieties of grains probably will be much more successful, however, when all common barberry bushes have been eradicated. The reason for this is shown in the recent important discoveries made in the Canadian Rust Research Laboratories at Winnipeg, Manitoba, and by E. C. Stakman and his co-workers at the University of Minnesota. Both of these groups, conducting independent research, proved that entirely new strains of the destructive black stem rust are produced if two different forms of the rust crossbreed on the barberry leaves. The certainty that new forms of the dangerous disease may appear suddenly, makes the eradication of the common barberry all the more imperative, since it is on the barberry alone that this crossing can occur in nature. The new and apparently resistant varieties of grains are not safe with barberries near. If for no other reason than to protect the new kinds of super wheat which are now in the process of being developed, all common barberry bushes should be destroyed.

Two ways of preventing excessive losses from stem rust also are recommended. These are: (1) The sowing of crops as early as possible in the spring; and (2) the sowing of varieties that mature early. When crops ripen early, either because they have been sown early or because the particular variety normally ripens early, stem rust usually causes little damage.

#### Control Measures for Other Rusts

There are over 2,000 species of plant diseases known as rusts. Barberry eradication will not control all of these rusts, but it will materially reduce the damage caused by black stem rust, which is the most destructive cereal disease in this State.

A rust known as orange leaf-rust appears on wheat in South Dakota nearly every year. In some seasons this disease causes serious damage. It may be easily distinguished from stem rust. The rusty spots occur more commonly on the leaves; they are orange in color and circular in shape. Stem rust occurs commonly on the stem in oblong spots brick-red to dark-red in color.

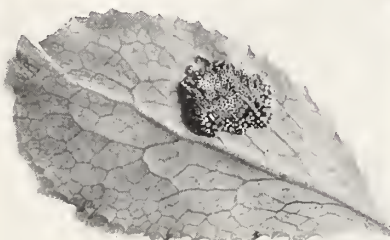


# BLACK STEM RUST SPREADS FROM COMMON BARBERRIES



to Wheat, Oats, Barley, Rye and other Grasses.

Black Stem Rust as it appears on the leaves of the Common Barberry



Enlarged single leaf



Plump healthy grain



Shriveled rusted grain

## DANGEROUS NEIGHBORS



Common Barberry Bushes growing near grain fields



Report Common Barberry bushes you may find to your State Leader of Barberry Eradication.



Common Barberry is harmful, destroy



Japanese Barberry is harmless do not destroy





There also is a leaf rust of oats which may cause considerable loss. In addition there are leaf rusts of rye and barley. In some seasons a disease known as flax rust causes serious damage to the crop.

It should be thoroughly understood that barberry eradication will control only stem rust. The other rusts must be controlled by different methods. The breeding of varieties of crops resistant to these diseases gives promise of becoming a control measure.

### The Barberry-Eradication Campaign

The demand for relief from the increasing losses caused by stem rust resulted in legislation against common barberry bushes and the organization of a campaign to find and destroy these bushes. Early in 1918 the present organization, cooperative between the United States Department of Agriculture and the 13 North-Central grain-growing States, was effected. Prior to this time, in 1917, North Dakota began the eradication of common barberries. By 1919 laws or other regulations prohibiting the growing of barberries became effective in each of the 13 States involved in the program.

The barberry-eradication campaign in South Dakota is directed by a State Leader under the supervision of the Office of Cereal Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C., and in cooperation with the South Dakota State College, the State Department of Agriculture, and other State and civic organizations. The Conference for the Prevention of Grain Rust of Minneapolis, composed of representatives of agricultural and allied interests, cooperates closely with the campaign.

As it is under Federal supervision, barberry eradication has been financed largely by Federal funds. Since the beginning of the campaign only \$15,000 in money has been furnished directly by the State. During the same period more than 12 times as much has been received from the Federal Government. Splendid support and some valuable indirect aid have been given by various organizations and institutions within the State.

State aid is necessary in order that adequate Federal funds may be received to carry on the eradication in this State. A part of the Federal appropriation must be matched by State funds. The total cost to the Federal Government and the State for finding and destroying more than 133,000 barberry bushes in South Dakota has been approximately \$3.00 per farm. On the other hand, the annual stem-rust loss in this State for the last 10 years is estimated to have been about \$125 per farm. In certain years, before barberry eradication was started, the average loss was approximately \$800 per farm.

### Results of the Campaign

Since the beginning of the campaign more than 133,000 barberry bushes have been found and destroyed on more than 1,300 farm and city properties in South Dakota, while more than 18,100,000 of these rust-spreading bushes have been eradicated in the 13 States engaged in barberry eradication.

The losses from black stem rust are being gradually reduced in inverse proportion to the total number of barberries destroyed. Reliable estimates by the United States Department of Agriculture place the average loss in the six years from 1915 to 1920 at more than 50,000,000 bushels of wheat per year. This was before many barberry bushes had been destroyed in the area. In the 8-year period from 1921 to 1928 the average annual loss has been reduced to less than 16,000,000 bushels of wheat, a reduction of 34,000,000 bushels on the average each year. Other control measures, including the breeding of varieties resistant to stem rust, the use of early-maturing varieties, and the early sowing of crops, have aided barberry eradication in accomplishing these results.

While great progress has been made in reducing the losses caused by black stem rust, much more remains to be done before the final goal is reached. Undoubtedly it will be many years before barberries are entirely eliminated from South Dakota, and even longer before they are all found and destroyed in some of the other States.

### Activities of Barberry Eradication

The activities of the barberry-eradication campaign consist of: (1) Surveys, (2) eradication, (3) publicity and education, and (4) investigation.

The problem of finding every barberry in South Dakota is an immense undertaking. This task is called the survey for barberry bushes, and is the major activity in the spring, summer, and fall months. Trained men are employed who cover the territory section by section, township by township, and finally county by county. Every foot of natural and planted timber is carefully inspected for barberry bushes.

A first or general survey for barberries in South Dakota was completed in 1924. This survey was conducted hurriedly to find and destroy a large number of barberry bushes in the shortest possible time, thus more rapidly reducing the possibilities of severe stem-rust losses. More than 60,000 large hedges and bushes were destroyed in the course of a few years. Bushes growing wild in out-of-the-way places of course were missed. These are being found at the present time on a second survey which is much more thorough.

The eradication of barberries after they have been located is comparatively easy. Digging usually will not completely kill them, but common crushed rock salt or kerosene when properly applied is very effective.

Publicity and education are important phases of barberry eradication in the winter months. This includes the job of telling the barberry and stem-rust story to the people of the State. Some information must accompany the surveys to acquaint the public with the purpose and progress of the work.

The purpose of publicity is to reach the public quickly and to secure the support and cooperation necessary for a successful survey. Materials designed to teach the public how to identify the common barberry and stem rust are all a part of publicity. Extensive use is made of news



articles, window displays, exhibits, demonstrations, bulletins, circulars, and circular letters. Talks, many of which are supplemented with lantern-slide pictures and motion-picture films, are given at various gatherings.

Educating pupils in schools and colleges how to recognize the common barberry gives them a real knowledge of the cause of black stem rust. Splendid cooperation is received from the State Department of Public Instruction, county superintendents, and teachers. Universities, colleges, normal schools, and teachers' colleges also are helping in this work. The instructors and teachers are furnished lesson plans, bulletins, circulars, charts, specimens of barberry and rust, and other material to aid them in teaching the story of stem rust and the common barberry. Some educational work also is carried on through organizations of young people, such as the Boys' and Girls' Clubs and the Young Citizens League.

This year a special effort was made to interest boys and girls in actually finding barberry bushes and reporting them to this office. Through the courtesy of the Conference for the Prevention of Grain Rust, it was possible to offer a bronze medal to every boy and girl who found and reported bushes. Five plantings of barberry bushes were reported in this manner in 1929. One report led to the finding of more than 200 bushes.

The chief investigation conducted in South Dakota includes a study of stem rust. Surveys are made each year to determine the prevalence and severity of stem rust and the damage that it has caused to small-grain crops. Studies on the epidemiology of stem rust are made to determine the influence of weather and other growth factors on the development of an epidemic of this disease. The spread of stem rust from barberry bushes to susceptible grains and grasses also is watched. The probability of stem-rust epidemics from spores blown into the State, and the possibility of the overwintering of the red stage of this disease in South Dakota and its return to small grains and grasses without the aid of the barberry, are given attention. The information thus far obtained in these studies indicates that the common barberry is the principal and probably the only important source of stem rust in this State.

The United States Department of Agriculture and the experiment stations in the eradication area conduct investigations which include (1) the classification of barberries and other closely related plants; (2) the testing of barberry species, varieties, and hybrids for their susceptibility to stem rust; (3) studies in connection with the problem of chemical eradication; and (4) the longevity of barberry seeds when buried in the soil.

#### Summary of All Activities, 1929

Approximately three counties of South Dakota were covered in an intensive survey this year. The system of surveying all natural and planted timber, in addition to all fence rows, retarded the work considerably. A resurvey of old barberry plantings was made in connection with the second survey and in areas of known escaped bushes in other counties. Approximately 758 barberry bushes, seedlings, and sprouting bushes were found in this State in 1929.

A careful stem-rust survey was carried on again this year. Stem rust did little damage over the State as a whole, yet the survey indicated several areas of infection that seemed to be due to local origin. These areas check remarkably closely with areas noted last year. If time and funds permit, these areas will be surveyed for barberry bushes next year.

Publicity and education intended to inform the people of the merits and progress of the work was continued. Several special educational projects were conducted this year. A contest in cooperation with the Conference for the Prevention of Grain Rust was sponsored to secure the best teaching plan for use in presenting the story of stem rust and barberry in grade schools. University, college, normal school, and high school instructors were invited to compete. The first-place winner in this State was given a prize of \$10.00 and the right to compete in the area-wide contest. South Dakota's entrant was placed seventh in the National contest.

Another educational project was sponsored in cooperation with the Extension Service of the South Dakota State College, consisting of a talk and a demonstration on the barberry and stem rust in connection with the agricultural short courses. The State Leader gave 30 different talks at community meetings which reached approximately 5,000 people. Short courses are sponsored by the Extension Service in various parts of the State each winter.

A special educational assistant also visited all of the high schools and city grade schools in the counties covered by intensive survey this year. Forty-four meetings were held which reached approximately 2,000 boys and girls. In addition there were interviews with high school and college instructors relative to barberry eradication.

Educational work was carried on through boys' and girls' clubs. The State Leader was one of the instructors in the Junior Short Course which is held each year at Brookings. Opportunity was given to present the barberry and stem-rust story to each class of boys in attendance. Eleven club camps were visited by the Assistant State Leader. A talk and instruction were given to each class of boys and girls.

In addition to these special projects the results of educational and publicity work may be summarized as follows: Eighty-one demonstrations were held throughout the State, consisting of fair demonstrations, field demonstrations, window demonstrations, and miscellaneous demonstrations. Speakers were furnished for more than 100 meetings. Study material was sent to approximately 1,700 schools. Three hundred and thirteen stories were published in weekly and daily papers, and five feature stories were published in various magazines. Approximately 51,000 pieces of educational and publicity material were sent to various people throughout the State. These consisted of bulletins, circulars, circular letters, posters, charts, lesson plans, specimens of grain and barberry, and novelties.

#### Problems of Survey and Eradication

Naturally the chief objective of the barberry-eradication campaign is to find and destroy every common barberry in South Dakota and in the



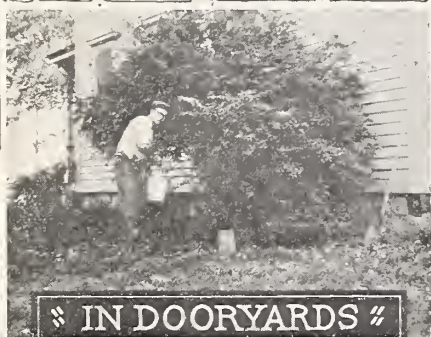


FLOWERS  
(yellow)



BERRIES  
(bright red)

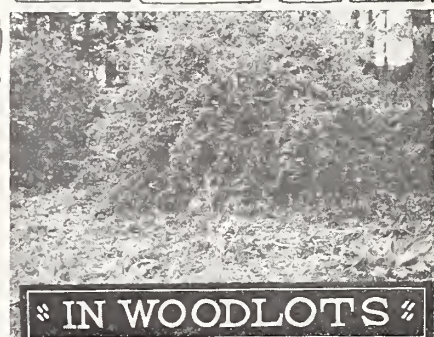
## Where Barberry Bushes Grow



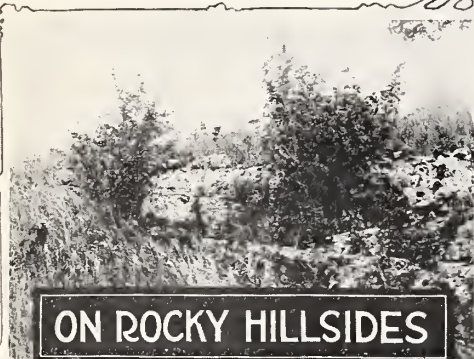
IN DOORYARDS



BIRDS CARRY BARBERRY SEEDS SEVERAL MILES, DROPPING THEM AMONG ROCKS AND IN OUT-OF-THE-WAY PLACES



IN WOODLOTS



ON ROCKY HILLSIDES



AS HEDGE FENCES

*Barberries spread by birds*



UNDER OTHER  
SHRUBS and TREES







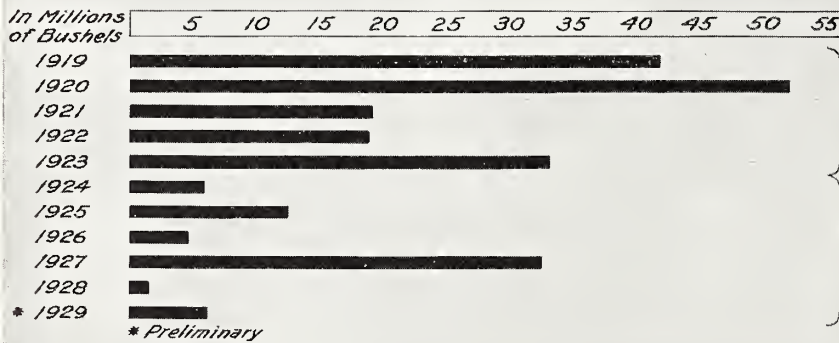
Salting a bush



Sprouts from a dug bush

## Common Salt Kills Barberry Bushes and Prevents Sprouting

### Wheat Losses in Barberry Eradication Area, 1919-1929



The average annual loss for the first five year period, 1919 to 1923, was approximately 33,000,000 bushels.

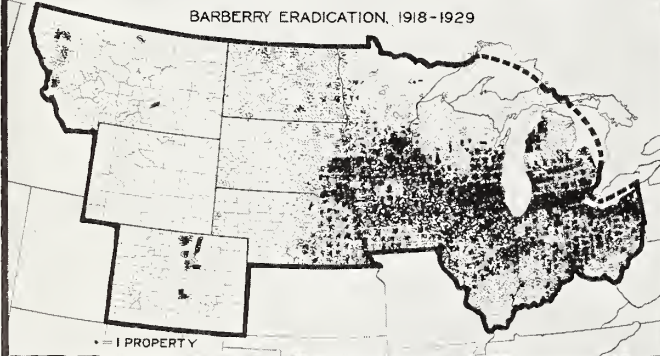
The average annual loss for the next six year period, 1924 to 1929, was approximately 10,500,000 bushels.

The losses to small grain crops caused by black stem rust have been reduced since the beginning of the barberry eradication campaign in 1918. The breeding of rust-resistant varieties, the use of early maturing varieties, and the sowing of crops early, have aided barberry eradication in this reduction.

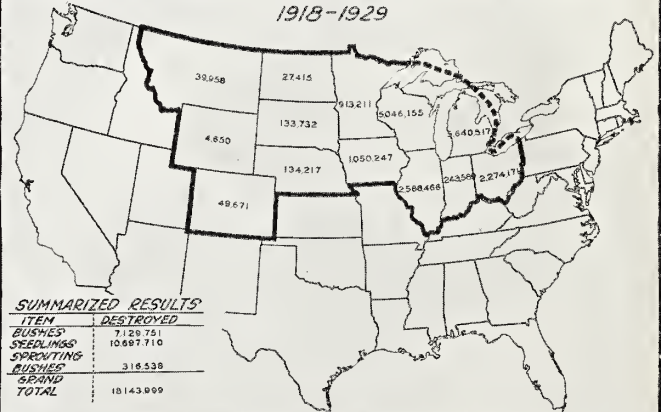
## "BARBERRY ERADICATION PAYS"

### RURAL PROPERTIES ON WHICH BARBERRY BUSHES WERE FOUND-ALL SURVEYS

BARBERRY ERADICATION, 1918-1929



### NUMBERS OF BARBERRY BUSHES AND SEEDLINGS DESTROYED 1918-1929





other 12 States engaged in this work. This task may at first seem simple, but experience has shown that many problems must be solved and a great deal of difficult work performed before complete eradication is possible. The State must be surveyed more than once. It is almost humanly impossible to cover a county even with the most careful survey and be sure that no bushes have been missed. Even if this were possible, there still would be danger of the State becoming infested by barberry seeds lying in and on the ground in the course of the survey. These seeds germinate and in a few years many of them produce new barberry bushes. Thus it is necessary to cover the State twice and in some areas several times to insure complete eradication.

Another danger lies in the possibility of barberry bushes being brought into South Dakota from other States outside the barberry-eradication area. Several such instances have been found in this State. A strict quarantine has been established to prohibit the shipping of barberry bushes, yet occasionally some plants are brought into the State without being inspected.

The above-mentioned are only a few of the problems confronting those responsible for the eradication of barberries. These and the many other problems will be more easily solved when every man, woman, and child takes an active interest in the campaign. If every person in South Dakota will cooperate in carefully inspecting his property and his community for barberry bushes and reporting them when found, the task will be comparatively easy. Prizes have been offered to encourage this practice, especially among the boys and girls. While some bushes have been found by this method, yet all have not been eradicated in some communities. Men especially trained to locate barberries are able to go into these communities and find many bushes overlooked by the volunteer co-operators.

#### Future Campaign Plans

The survey for barberry bushes by trained men must continue until every county in the State has been carefully covered. It then will be necessary to revisit certain properties and certain areas to destroy barberries that have grown from seed since the last survey. This is a tremendous task that will take years for completion.

Public interest must be increased so that even after the experienced field agents have completed their task, a constant watch will be kept to prohibit new bushes from getting started. This interest can be increased only through continued efforts in promoting educational and publicity activities.

#### Conclusion

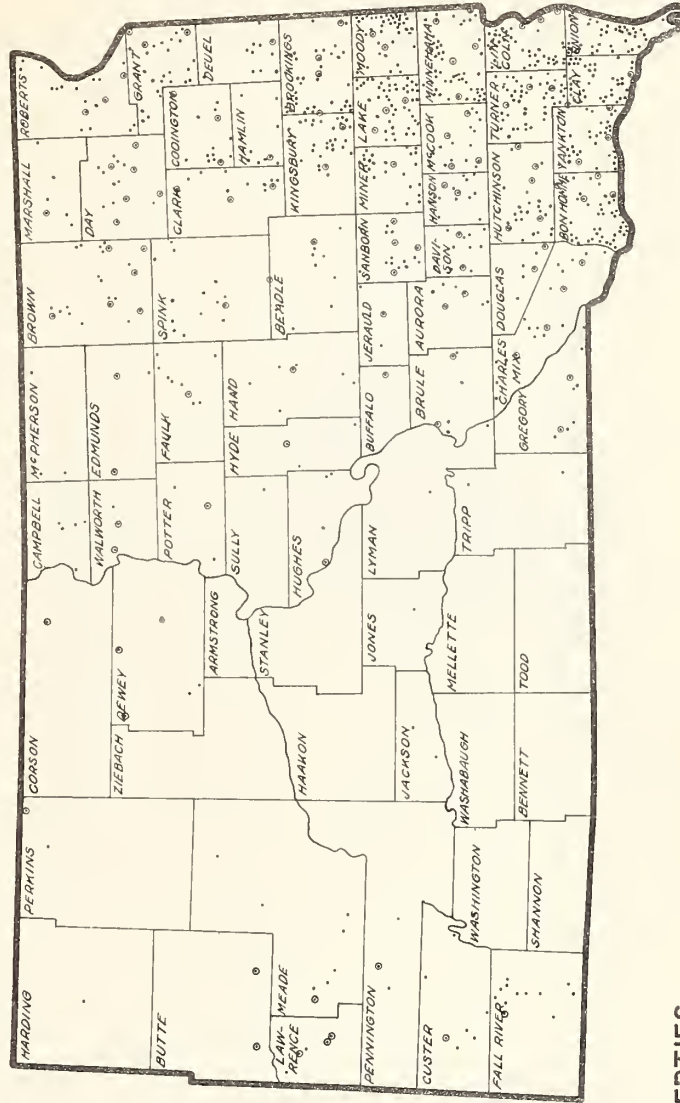
Barberry eradication is a safe and sane sanitation measure. As no progressive livestock farmer would voluntarily allow an animal affected with tuberculosis to remain in his herd, neither should he permit a common barberry to grow on his farm or in his community. One small barberry not only may start an epidemic of stem rust, but in time it will cause the entire community to become reinfested with additional rust-spreading bushes. Therefore, this campaign will not be completed until the last common barberry bush has been found and eradicated.





# PROPERTIES HAVING BARBERRY BUSHES 1918-1929

## SOUTH DAKOTA



1,303 PROPERTIES  
133,732 BUSHES

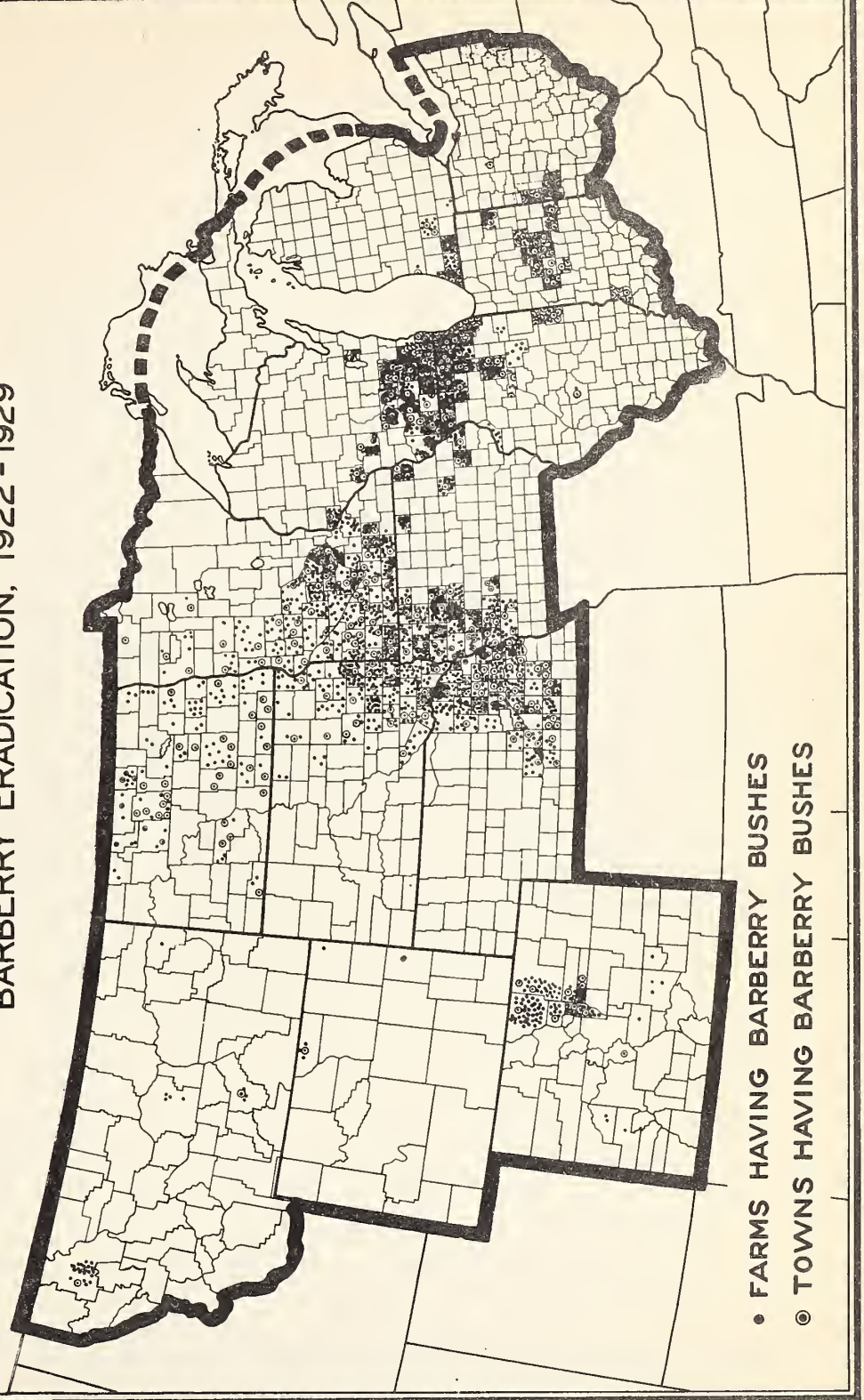
· FARMS HAVING BARBERRY BUSHES  
· TOWNS HAVING BARBERRY BUSHES





# RURAL PROPERTIES ON WHICH, AND CITIES IN WHICH BARBERRY BUSHES WERE FOUND SECOND SURVEY

BARBERRY ERADICATION, 1922 - 1929







# Common Barberry Spreads Black Stem Rust

## Know Common Barberry

Look For It!

*When you find  
a spiny bush  
with-*

*Edges of leaves  
like this*



*Spines like these*



*Berries like these*



*Inner bark yellow*



*It is a  
Common Barberry  
and should be  
reported at once*

*Spread of  
Barberries by  
birds*

*Birds eat the  
berries*



*Carry them to their  
roosting places*



*Where they cough  
up the seeds*



*From which seedling  
bushes grow*



*They in time  
bear fruit which  
is again carried  
farther on*

## Look For and Report All Common Barberry Bushes

To the State Leader of Barberry Eradication, in care of your State Department  
of Agriculture or your State Agricultural College.

# Common Barberry Bushes

*spread*

## *Black Stem Rust*

*to*

WHEAT, OATS,  
BARLEY, RYE,  
*and* Many Wild  
Grasses

THIS Progress Report is prepared and printed by the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C. The cover is furnished by the Conference for the Prevention of Grain Rust, 300 Lewis Building, Minneapolis, Minnesota.